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EXAMINER

GRAYBILL, DAVID E

ART UNIT

PAPER NUMBER

2827

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/544,822

Applicant(s)

JIANG, TONGBI

Examiner

David E Graybill

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 January 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-62 is/are pending in the application.
- 4a) Of the above claim(s) 33-57 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 and 58-62 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

The indicated allowability and provisional allowability of claims 3, 7-8, 61 and 62 is withdrawn in view of the newly discovered references to Dery and Plueddemann. Rejections based on the newly cited reference follow.

Applicant is advised that should claim 5 be found allowable, claim 6 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claims 8 and 61 are objected to because the term "glycidoxypropyltinethoxysilane" appears to be a misspelling. In light of the totality of the record, for examination purposes, it is presumed that the correct spelling is *glycidoxypropyltrimethoxysilane*.

Claims 3, 61 and 62 are rejected under 35 U.S.C. 101 because the disclosed invention is inoperative and therefore lacks utility. To further clarify, claims 3, 61 and 62 recite the limitations, "said wetting agent layer includes a layer of silane," "said wetting agent layer comprises one of silane," and, "applying a silane layer," respectively. However, the

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melting point of silane is -185 deg. C, and this relatively extremely low process temperature is not disclosed. Therefore, in the disclosed process, it appears that the silane layer is a gas, which gas would be inoperative as the claimed wetting agent layer.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 3, 61 and 62 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that applicant, at the time the application was filed, had possession of the claimed invention. The non-described subject matter is the claim 3, 61 and 62 limitations addressed in the 35 U.S.C. 101 rejection supra.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3, 9, 61, 62 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to

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particularly point out and distinctly the subject matter which applicant regards as the invention.

In claims 3, 61 and 62, for the reasons indicated in the 35 U.S.C. 101 rejection supra, the process of using silane as the wetting agent layer cannot be understood and appears to be incorrect.

In claim 9, there is insufficient literal antecedent basis for the terms, "said active surface," and, "said top surface."

In claim 9, the scope of the limitation, "a material for increasing the surface tension to one of said active surface and said top surface" cannot be determined because the language, "for increasing the surface tension to one of said active surface and said top surface" appears to be grammatically incorrect, and is incomprehensible.

Claims 3 and 62 have not been rejected over the prior art because, in light of the 35 U.S.C. 112 rejections supra, there is a great deal of confusion and uncertainty as to the proper interpretation of the limitations of the claims; hence, it would not be proper to reject the claims on the basis of prior art. As stated in *In re Steele*, 305 F.2d 859, 134 USPQ 292 (CCPA 1962), a rejection should not be based on considerable speculation about the meaning of terms employed in a claim or

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assumptions that must be made as to the scope of the claims.

See also MPEP 2173.06.

In the rejections infra, reference labels are generally recited only for the first recitation of identical claim language.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1, 2, 4-7, 9-12, 15, 22 and 58-60 are rejected under 35 U.S.C. 102(e) as being anticipated by Dery (6074895).

At column 1, lines 51-62; column 2, line 52 to column 5, line 11; column 5, lines 51-59; and column 6, lines 13-54, Dery teaches the following:

1. A method for applying a material between a semiconductor device having a surface and a substrate having a surface, said method comprising: applying a wetting agent layer 111, 124 to one of said surface of said semiconductor device 110 and said surface of said substrate 120; and applying a flowable material 140 between the substrate and the semiconductor device.
2. The method according to 1, wherein said semiconductor device is attached to said substrate.
4. The method according to 1, wherein said applying said wetting agent layer comprises any one of a dispensing method, a brushing method, and a spraying method.
5. The method according to 1, wherein said wetting agent layer comprises at least one layer.
6. The method according to 1, wherein said wetting agent layer comprises one or more layers.
7. The method according to 1, wherein said wetting agent layer comprises a plurality of layers.
9. The method according to 1, wherein said applying said wetting agent layer comprises providing a material for increasing the

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surface tension to one of said active surface and said top surface for the application of an underfill material.

10. A method for applying a material between a semiconductor device and a substrate, said method comprising: providing a semiconductor device having an active surface, another surface, a first end, a second end, a first lateral side, and a second lateral side ["all four sides"], said first end, said second end, said first lateral side, and said second lateral side forming at least a portion of a periphery of said semiconductor device; providing a substrate having an upper surface, a first side wall, a second side wall, a first lateral side wall and a second lateral side wall; applying a wetting agent layer to one of said active surface of said semiconductor device and said upper surface of said substrate; and applying a flowable material between said semiconductor device and said substrate.

11. The method according to 10, wherein said flowable material is applied substantially adjacent to at least one end of said semiconductor device.

12. The method according to 10, wherein said flowable material substantially fills a gap between said semiconductor device and said substrate.

15. The method according to 10, wherein said flowable material is provided substantially adjacent to said at least a portion of

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the periphery of said semiconductor device to fill a gap between said substrate and said semiconductor device.

22. The method according to 10, wherein said applying said flowable material comprises: providing said flowable material substantially adjacent said first end ["one or more edges" of said semiconductor device for filling between said substrate and said semiconductor device by one or more forces acting upon said flowable material.

58. A method for attaching a semiconductor assembly, said method comprising: providing a semiconductor device having an active surface; providing a substrate having an upper surface; applying a wetting agent layer to one of said active surface of said semiconductor device and said upper surface of said substrate; connecting said semiconductor device to said substrate so that said active surface of said semiconductor device faces said upper surface of said substrate; and applying an underfill material between the substrate and the semiconductor device.

59. The method according to 58, wherein applying said wetting agent layer comprises any one of a dispensing method, a brushing method, and a spraying method.

60. The method according to 58, wherein said wetting agent layer comprises at least one layer.

To further clarify the teaching wherein said applying said wetting agent layer comprises any one of a dispensing method, a brushing method, and a spraying method, it is noted that it is inherent in the process that the layer is dealt out in portions; therefore, it is inherent that the layer is dispensed.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 8 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dery as applied to claims 1, 2, 4-7, 9-12, 15, 22 and 58-60 and further in combination with Plueddemann (4231910).

Dery does not appear to explicitly teach the following:

8. The method according to 1, wherein said wetting agent layer comprises one of glycidoxypropyltinethoxysilane and ethyltrimethoxysilane.

61. The method according to 58, wherein said wetting agent layer comprises one of silane, glycidoxypropyltinethoxysilane, and ethyltrimethoxysilane.

Nonetheless, at column 1, lines 5-8, 21-23 and 55-63; column 2, lines 5-49; column 3, lines 22-54; column 3, line 65 to column 4, line 10; column 4, lines 24-27 and 58-62; and column 7, line 4 to column 8, line 5, Plueddemann teaches wherein a wetting agent layer comprises one of glycidoxypopyl tinethoxysilane and ethyltrimethoxysilane.

In addition, it would have been obvious to combine the process of Plueddemann with the process because both Plueddemann and Dery are drawn to improving adhesion of a plastic, and the process of Plueddemann would improve the adhesion of the plastic of Dery.

Claims 13, 14, 16-21, and 23-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dery as applied to claims 1, 2, 4-7, 9-12, 15, 22 and 58-60 supra, and further in combination with Akram (5766982).

Dery does not appear to explicitly teach the following:

13. The method according to 10, wherein said substrate includes an aperture extending through said substrate.
14. The method according to 13, wherein said aperture is located adjacent to said another surface of said semiconductor device.
16. The method according to 10, further comprising: elevating at least said first side wall of said substrate and said first end of said semiconductor device.

17. The method according to 16, wherein said elevating said first side wall of said substrate comprises placing said substrate on a support structure and elevating at least one portion of said support structure.

18. The method according to 16, further comprising: providing a dam on the substrate adjacent to at least one of said first end, said second end, said first lateral side and said second lateral side of said semiconductor device.

19. The method according to 18, wherein said dam extends to substantially between said semiconductor device and said substrate.

20. The method of 10, further comprising: vibrating one of said semiconductor device and said substrate.

21. The method according to 20, wherein said vibrating one of said semiconductor device and said substrate comprises placing said substrate on a support structure and vibrating said support structure.

23. The method according to 10, wherein said substrate includes at least one aperture extending through said substrate and substantially located adjacent to said another surface of said semiconductor device.

24. The method according to 23, wherein said flowable material is provided through said at least one aperture of said substrate

substantially filling a gap between said substrate and said semiconductor device.

27. The method according to 18, wherein said substrate includes at least one aperture extending therethrough and substantially located adjacent to said another surface of said semiconductor device.

29. The method according to 28, wherein said flowable material is provided from below said substrate.

30. The method according to 28, wherein said flowable material is provided through said at least one aperture contacting at least a portion of said another surface of said semiconductor device.

Nevertheless, at column 4, line 36 to column 7, line 17, Akram teaches a process wherein a substrate 10 includes an aperture extending through a substrate, an aperture 60 is located adjacent [nearby] to another surface of a semiconductor device 12; elevating at least a first side wall of the substrate and a first end of the semiconductor device, wherein elevating a first side wall of the substrate comprises placing the substrate on a support structure 44 and elevating at least one portion of a support structure; providing a dam 40 on the substrate adjacent to at least one of a first end, a second end, a first lateral side and a second lateral side of a semiconductor

device, wherein a dam extends to substantially between a semiconductor device and a substrate; vibrating 48 one of a semiconductor device and a substrate, wherein vibrating one of a semiconductor device and a substrate comprises placing a substrate on a support structure and vibrating a support structure, wherein a flowable material 28 is provided through at least one aperture of a substrate substantially filling a gap 26 between a substrate and a semiconductor device, and wherein a flowable material is provided through a at least one aperture contacting [at least indirect physical contact and thermal contact] at least a portion of another surface of a semiconductor device.

Moreover, it would have been obvious to combine the process of Akram with the process of Dery because it would facilitate applying the flowable material 140 between the substrate and the semiconductor device.

Also, in the combination, Dery teaches the following:

25. The method according to 18, wherein a applying a flowable material comprises: providing a flowable material substantially adjacent to a first end of a semiconductor device for filling a gap between a substrate and a semiconductor device.

26. The method according to 18, wherein said applying said flowable material comprises:

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providing said flowable material substantially adjacent to said first end and one of said first lateral side and said second lateral side of said semiconductor device for filling a gap between said substrate and said semiconductor device.

28. The method according to 27, wherein a flowable material is provided from below a substrate.

Claims 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dery as applied to claims 1, 2, 4-7, 9-12, 15, 22 and 58-60 supra, and further in view of Banerji (5203076).

Dery does not appear to explicitly teach the following:

31. The method according to 10, wherein said applying said flowable material between said semiconductor device and said substrate further comprises placing said semiconductor device and said substrate in a chamber, said chamber having an atmosphere therein having a variable pressure.

32. The method according to 31, further comprising: varying the pressure of said atmosphere in said chamber for said flowable material substantially filling a gap between said semiconductor device and said substrate.

Regardless, at column 2, lines 55-68, and column 3, lines 1-10, Banerji teaches a process wherein applying a flowable material 22 between a semiconductor device 10 and a substrate 20

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comprises placing the semiconductor device and the substrate in a chamber 32 having an atmosphere therein having a variable pressure, and varying the pressure of the atmosphere in the chamber for the flowable material substantially filling a gap 18 between the semiconductor device and the substrate.

Furthermore, it would have been obvious to combine the process of Banerji with the process of Dery because it would facilitate applying the flowable material 140 between the substrate and the semiconductor device.

The prior art made of record and not applied to the rejection is considered pertinent to applicant's disclosure. It is cited primarily to show inventions similar to the instant invention.

Any telephone inquiry of a general nature or relating to the status (MPEP 203.08) of this application or proceeding should be directed to the group receptionist whose telephone number is 703-308-1782.

Any telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (703) 308-2947. Regular office hours: Monday through Friday, 8:30 a.m. to 6:00 p.m.

The fax phone number for group 2800 is 703/305-3431.



David E. Graybill
Primary Examiner
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D.G.

17-Apr-02